

Via Electronic Mail

June 14, 2019

Claudia Smith
Tribal NSR Permits Lead
USEPA Region 8
1595 Wynkoop Street
Denver, CO 80202

**RE: Federal New Minor Source Review Program in Indian Country
Registration for Existing Sources
EP Energy E&P Company, L.P.
Fowles 1-26A1**

Dear Ms. Smith:

On behalf of EP Energy E&P Company, L.P. (EP Energy), Peakview Environmental, LLC (Peakview) is submitting the enclosed Registration for Existing Sources for the Fowles 1-26A1 well site. The well site began production on March 29, 1984.

On October 30, 2018 the Utah Department of Environmental Quality, Division of Air Quality (UDAQ) notified EP Energy that the site was located within USEPA's boundary of Indian Country and is not under the jurisdiction of UDAQ. Therefore, EP Energy is submitting this Registration for Existing Sources under the USEPA Federal Minor New Source Review Program in Indian Country.

Please contact Chelsea Cantrelle, EP Energy at chelsea.cantrelle@epenergy.com or me at julie.spear@epenergy.com with any questions.

Sincerely,

PEAKVIEW ENVIRONMENTAL, LLC



Julie Spear, PE
Principal Engineer

Enclosures

cc: Chelsea Cantrelle, EP Energy
Bruce Pargeets, Director, Ute Indian Tribe Energy & Minerals Department
Mark Natchees, Air Coordinator, Ute Indian Tribe Energy & Minerals Department


MINOR NSR REGISTRATION FOR EXISTING SOURCE FORM REG - ATTACHMENT

Fowles 1-26A1
Remote Location
Uintah County, Utah

Prepared For:

EP ENERGY 

EP Energy E&P Company, L.P.
P.O. Box 4660
Houston, Texas 77210-4660

Submitted By:  Peakview Environmental LLC
2412 Iris Avenue
Boulder, Colorado 80304

June 2019

Project No. EP0522018

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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN
COUNTRY
40 CFR 49.151**

**Registration for Existing Sources
(FORM REG)**

Use of this information request form is voluntary and not yet approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your registration. While submittal of this form is not required, it does offer details on the information we will use to complete your registration and providing the information requested will help build an existing source emissions inventory. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

Please submit information to following two entities:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, CO 80202-1129
R8airpermitting@epa.gov

For more information, visit:
<http://www.epa.gov/caa-permitting/tribal-nsr-permitting-region-8>

The Tribal Environmental Contact for the specific reservation:

Mike Natchees

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact:

R8airpermitting@epa.gov

A. GENERAL SOURCE INFORMATION

1. (a) Company Name (Who owns this facility?) EP Energy E&P Company, L.P.		2. Facility Name Fowles 1-26A1 API# 43-047-31296	
(b) Operator Name (Is the company that operates this facility different than the company that owns this facility? What is the name of the company?)			
3. Type of Operation Oil and Gas Production Facility		4. Portable Source? Yes No X 5. Temporary Source? Yes No X	
6. NAICS Code 211111		7. SIC Code 1311	
8. Physical Address (Or, home base for portable sources) Remote location near Altamont, UT			
9. Reservation* Uintah and Ouray	10. County* Uintah	11a. Latitude (decimal format)* 40.36425	11b. Longitude (decimal format)* -109.95976
12a. Quarter Quarter Section* NWSE	12b. Section* 26	12c. Township* 1S	12d. Range* 1W

* Provide all locations of operation for portable sources

B. CONTACT INFORMATION

Company Contact (Who is the <u>primary</u> contact for the company that owns this facility?) Chelsea Cantrelle		Title HSER Advisor
Mailing Address P.O. Box 4660 Houston, TX 77210-4660		
Email Address chelsea.cantrelle@epenergy.com		
Telephone Number 713-997-6206	Facsimile Number	
Operator Contact (Is the company that operates this facility different than the company that owns this facility? Who is the <u>primary</u> contact for the company that operates this source?)		Title
Mailing Address		
Email Address		
Telephone Number	Facsimile Number	
Permitting Contact (Who is the person <u>primarily</u> responsible for Clean Air Act permitting for the company? We are seeking one main contact for the company. Please do not list consultants.) Chelsea Cantrelle		Title HSER Advisor
Mailing Address P.O. Box 4660, Houston, TX 77210-4660		
Email Address chelsea.cantrelle@epenergy.com		
Telephone Number 713-997-6206	Facsimile Number	
Compliance Contact (Is the person responsible for Clean Air Act compliance for this company different than the person responsible for Clean Air Act permitting? Who is the person <u>primarily</u> responsible for Clean Air Act compliance for the company? We are seeking one main contact for the company. Please do not list consultants.) Chelsea Cantrelle		Title HSER Advisor
Mailing Address P.O. Box 4660, Houston, TX 77210-4660		
Email Address chelsea.cantrelle@epenergy.com		
Telephone Number 713-997-6206	Facsimile Number	

C. ATTACHMENTS**Include all of the following information as attachments to this form**

Narrative description of the operations

Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c))

Identification and description of any existing air pollution control equipment and compliance monitoring devices or activities

Type and amount of each fuel used

Type raw materials used

Production Rates

Operating Schedules

Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated NSR pollutants at your source.

Total allowable (potential to emit if there are no legally and practically enforceable restrictions) emissions from the air pollution source for the following air pollutants: particulate matter, PM₁₀, PM_{2.5}, sulfur oxides (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H₂SO₄), hydrogen sulfide (H₂S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

Estimates of the total actual emissions from the air pollution source for the following air pollutants: particulate matter, PM₁₀, PM_{2.5}, sulfur oxides (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H₂SO₄), hydrogen sulfide (H₂S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

Other

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

D. TABLE OF ESTIMATED EMISSIONS

The following estimates of the total emissions in tons/year for all pollutants contained in your worksheet stated above should be provided.

Pollutant	Total Actual Emissions (tpy)	Total Allowable or Potential Emissions (TPY)	
PM	0.14	0.14	PM - Particulate Matter PM ₁₀ - Particulate Matter less than 10 microns in size PM _{2.5} - Particulate Matter less than 2.5 microns in size SO ₂ - Sulfur Oxides NO _x - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H ₂ SO ₄ - Sulfuric Acid Mist H ₂ S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM₁₀	0.14	0.14	
PM_{2.5}	0.14	0.14	
SO₂	0.00	0.00	
NO_x	1.83	1.83	
CO	1.53	1.53	
VOC	5.58	5.58	
Pb	NA	NA	
Fluorides	NA	NA	
H₂SO₄	NA	NA	
H₂S	0.00	0.00	
TRS	0.00	0.00	
RSC	0.00	0.00	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

- (a) Coal cleaning plants (with thermal dryers);
- (b) Kraft pulp mills;
- (c) Portland cement plants;
- (d) Primary zinc smelters;
- (e) Iron and steel mills;
- (f) Primary aluminum ore reduction plants;
- (g) Primary copper smelters;
- (h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
- (i) Hydrofluoric, sulfuric, or nitric acid plants;
- (j) Petroleum refineries;
- (k) Lime plants;
- (l) Phosphate rock processing plants;
- (m) Coke oven batteries;
- (n) Sulfur recovery plants;
- (o) Carbon black plants (furnace process);
- (p) Primary lead smelters;
- (q) Fuel conversion plants;
- (r) Sintering plants;
- (s) Secondary metal production plants;
- (t) Chemical process plants
- (u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
- (v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
- (w) Taconite ore processing plants;
- (x) Glass fiber processing plants;
- (y) Charcoal production plants;
- (z) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, and
- (aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

Instructions

Please answer all questions. If the item does not apply to the source and its operations write "n/a". If the answer is not known write "unknown".

A. General Source Information

1. Company Name & Operator Name (if the operator of the facility is different than the owner, please provide this information): Provide the complete company and operator names. For corporations, include divisions or subsidiary names, if any.
2. Facility Name: Provide the facility name. Please note that a facility is a site, place, location, etc... that may contain one or more air pollution emitting units.
3. Type of Operation: Indicate the generally accepted name for the operation (i.e., asphalt plant, gas station, dry cleaner, sand & gravel mining, oil and gas wellsite, tank battery, etc.).
4. Portable Source: Will this facility operate in more than one location? Some examples of portable sources include asphalt batch plants and concrete batch plants.
5. Temporary Source: A temporary source, in general, would have emissions that are expected last less than 12 months.
6. NAICS Code: North American Industry Classification System. The NAICS Code for your facility can be found at the following link → [North American Industry Classification System](http://www.census.gov/epcd/naics/nsic2ndx.htm#S1) (<http://www.census.gov/epcd/naics/nsic2ndx.htm#S1>).
7. SIC Code: Standard Industrial Classification Code. Although the new North American Industry Classification System (NAICS) has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your facility can be found at the following link → [Standard Industrial Classification Code](http://www.osha.gov/pls/imis/sic_manual.html) (http://www.osha.gov/pls/imis/sic_manual.html).
8. Physical Address: Provide the actual address of where you are proposing to construct the new facility, not the mailing address. Include the State and the ZIP Code.
9. Reservation: Provide the name of the Indian reservation within which the facility will be constructed.
10. County: Provide the County within which the source will be constructed.
- 11a & 11b. Latitude & Longitude: These are GPS (global positioning system) coordinates.
- 12a – 12d. Section-Township-Range: Please provide these coordinates in 1/4 Section/Section/Township/Range. (e.g., SW 1/4, NE 1/4 S36/T10N/R21E).

B. Contact Information

Please provide the information, requested, in full.

1. Company Contact: Provide the full name of the primary contact for the company that owns the facility.
2. Operator Contact: Provide the name of the primary contact for the company that operates the facility if the company operating the facility is different from the company that owns the facility.
3. Permitting Contact: Provide the name of primary contact, for permitting decisions, at the company that owns the facility or the company that operates the facility.
4. Compliance Contact: Provide the name of primary contact, responsible for compliance of the facility, at the company that owns the facility or the company that operates the facility. If this is the same as the Permitting Contact please note this on the form.

C. Attachments

The information requested in the attachments will enable EPA to understand the type of source being registered and the nature and extent of the air pollutants being emitted.

D. Total Emissions

1. Allowable Emissions (See also, Potential to Emit): Emissions rate of a source calculated using the maximum rated capacity of the source (unless the source is subject to practically and legally enforceable limits which restrict the operating rate, or hours of operation, or both) and the most stringent of the following:
 - a) Any applicable standards as set forth in 40 CFR parts 60 and 61;
 - b) Any applicable Tribal or Federal Implementation Plan emissions limitation, including those with a future compliance date; or
 - c) Any emissions rate specified as a federally enforceable permit condition, including those with a future compliance date.
2. Potential to Emit: The maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable as a practical matter. See Allowable Emissions.
3. Actual Emissions: Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. For a source that operated during the entire calendar year preceding the initial registration submittal, the reported actual emissions typically should be the annual emissions for the preceding calendar year, calculated using the actual

operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted during the preceding calendar year. However, if you believe that the actual emissions in the preceding calendar year are not representative of the emissions that your source will actually emit in coming years, you may submit an estimate of projected actual emissions along with the actual emissions from the preceding calendar year and the rationale for the projected actual emissions. For a source that has not operated for an entire year, the actual emissions are the estimated annual emissions for the current calendar year.

4. The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources:
 - (i) Source-specific emission tests;
 - (ii) Mass balance calculations;
 - (iii) Published, verifiable emission factors that are applicable to the source. (i.e., manufacturer specifications).
 - (iv) Other engineering calculations; or
 - (v) Other procedures to estimate emissions specifically approved by the Reviewing Authority.
5. Guidance for estimating emissions can be found at <http://www.epa.gov/ttn/chief/efpac/index.html>.

1.0 INTRODUCTION

EP Energy E&P Company L.P. (EP Energy) owns and operates the Fowles 1-26A1 site (site), an existing oil and gas production site located in Uintah County, Utah. The site began production on March 29, 1984. The site services one well, Fowles 1-26A1, API# 43-047-31296. For the period January 1, 2018 through December 31, 2018 the production rate for the well was 5.4 barrels of oil per day (BOPD) or 1,988 barrels of oil per year (BOPY).

Previously, the Fowles 1-26A1 site was considered a small source under the jurisdiction of the Utah Department of Environmental Quality, Division of Air Quality (UDAQ). In July 2018, per Utah Administrative Code R307-505, EP Energy submitted a Permit by Rule registration for existing sources. On October 30, 2018 EP Energy was notified by UDAQ that the Fowles 1-26A1 site lies within the EPA's boundary for Indian Country and is not under the jurisdiction of UDAQ. Therefore, EP Energy is submitting this Registration for Existing Sources under the USEPA Federal Minor New Source Review Program in Indian Country.

1.1 Site Description

Equipment/emission sources currently located at the site consist of the following:

- Two (2) 500-bbl heated oil storage tanks
- One (1) 600-bbl heated produced water storage tank
- One (1) 600-bbl heated overflow storage tank
- One (1) heater treater and various natural gas-fired heaters ≤ 7.5 -MMBtu/hr combined total
- Oil and produced water truck loading
- One (1) 7.7-MMBtu/hr combustor
- Equipment fugitives
- Electric pump jack

2.0 PROCESS DESCRIPTION

The Fowles 1-26A1 site includes one wellhead with separation and storage capability produces approximately 2,000 BOPY. The site operates 8,760 hours per year. A general process flow diagram and site plan are included in Appendix A.

Well production is brought to the surface via an electric pump jack and routed to a heater treater to separate the well fluids into three constituent phases: oil, gas and water. The separated oil phase is routed to the heated oil storage tanks prior to truck transport offsite to sales. The separated water phase is routed to the heated produced water storage tank prior to being transported offsite for disposal. Both oil and produced water is transferred to tanker trucks utilizing the submerged loading method. The separated gas phase is routed to the gas sales pipeline. During an emergency upset condition oil or produced water may be rerouted to an overflow tank.

The heater treater and heated storage tanks utilize natural-gas-fired heaters of various ratings. The natural gas fuel for the heaters is residual gas from the natural gas processing plant and is assumed to be pipeline specification quality. The total rating for all heaters is ≤ 5.0 MMBtu/hr.

Oil and produced truck loading emissions are uncontrolled.

3.0 EMISSION CALCULATIONS

Emission calculations for this registration are included in Appendix B of this document. Calculation methodologies for each emission source are discussed in the following sections.

3.1 Representative Analysis

Emissions calculations are based on a liquid sample collected from the separator at the Powell 2-13A2 facility on June 17, 2016. Laboratory analysis of the flash gas evolved from hydrocarbon liquid and extended hydrocarbon analysis of the liquids were conducted on this sample. The laboratory report is included in Appendix B.

3.2 Green House Gas Emissions

Controlled and uncontrolled greenhouse gas (GHG) emissions were calculated using CO₂ and CH₄ emissions, AP-42 emission factors and 40 CFR 98 Subpart C emission factors. Total GHG emissions in CO₂e (tpy) were calculated using Global Warming Potentials from 40 CFR 98 Subpart A, Table A-1. Controlled storage tank GHG emissions are accounted for in the combustor emissions.

3.3 Storage Tanks

3.3.1 Oil Storage Tanks

Tank flash losses from the oil storage tanks were calculated using the gas-to-oil ratio (GOR) measured by laboratory procedures method and the flash gas composition from the laboratory flash liberation of liquid hydrocarbon analysis.

Working and standing emission losses from the oil storage tanks were calculated using EPA TANKS 4.09d to determine total annual emissions from the tanks. The output from a Promax simulation using the stable oil option was used to speciate the total emissions from the TANKs report. The detailed TANKs report and the Promax output are included in Appendix B.

3.3.2 Produced Water Storage Tank

The well fluids undergo separation in the heater treater where oil/water/gas are separated. Low levels of dissolved hydrocarbons remain in the produced water. Produced water VOC emissions are estimated by taking a 99% reduction from the oil VOC emissions.

3.3.3 Overflow Storage Tank

The overflow tank remains empty except in emergency upset conditions when either the oil or produced water tanks are rerouted to the overflow tank. The overflow tank is emptied when practicable following the upset event. Total site production/throughput is not affected by the use of the overflow tank therefore; use of the tanks does not affect the site-wide VOC emissions.

3.4 Crude Oil and Produced Water Loading

Uncontrolled crude oil truck loading emissions were calculated using the AP-42 Section 5.2, equation 1 and submerged loading constants from Table 5.2-1. Produced water emissions are assumed to be negligible due to the low concentrations of dissolved VOCs present in the produced water.

3.5 Heaters

The combined heater emissions were calculated using AP-42 Section 1.4 emission factors. Pipeline quality natural gas is used as fuel for the heaters.

3.6 Equipment Fugitives

Equipment fugitives were calculated using the flash gas composition and 40 CFR 98 Subpart W emission factors. Component counts were estimated based on 40 CFR 98, Subpart W, Table W-1B.

4.0 FEDERAL REGULATORY APPLICABILITY ANALYSIS

The following section addresses the applicability of Federal Standards for the affected facilities at the site.

The facility is not located within a designated non-attainment area for purposes of determining Federal Non-Attainment New Source Review permitting applicability, the Facility is not an existing major source for purposes of evaluating the applicability of Prevention of Significant Deterioration (PSD) review requirements.

4.1 New Source Performance Standards (40 CFR Part 60)

Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

This subpart is not applicable, there are no compression ignition internal combustion engines at the site.

Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

There are no stationary reciprocating internal combustion engines (RICE) located at the site; therefore this subpart does not apply.

Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

This subpart does not apply to the storage tanks because they are used to store petroleum or condensate prior to custody transfer, and the design capacity of each tank does not exceed 1,589.874 m³ (3,061,721 gallons) according to 40 CFR §60.110b(d)(4).

Subpart KKKK: Standards of Performance for New Stationary Combustion Turbines

There are no stationary combustion turbines located at the site; therefore, this subpart does not apply.

Subpart OOOO/OOOOa: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution

The well was completed on August 17, 2016, after the applicability dated of this subpart, therefore; the well site is subject to the requirements of Subpart OOOOa.

4.2 National Emission Standards for Hazardous Air Pollutants (40 CFR Part 63)

Subpart DDDDD: National Emission Standards for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters

The site is not a major source therefore the site is not subject to this subpart.

Subpart HH: National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities

The facility does not have a TEG dehydration unit; therefore, the facility is not subject to this subpart according to 40 CFR §63.760(b)(2).

Subpart HHH, National Emissions Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities

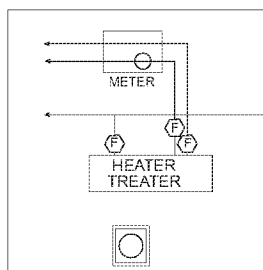
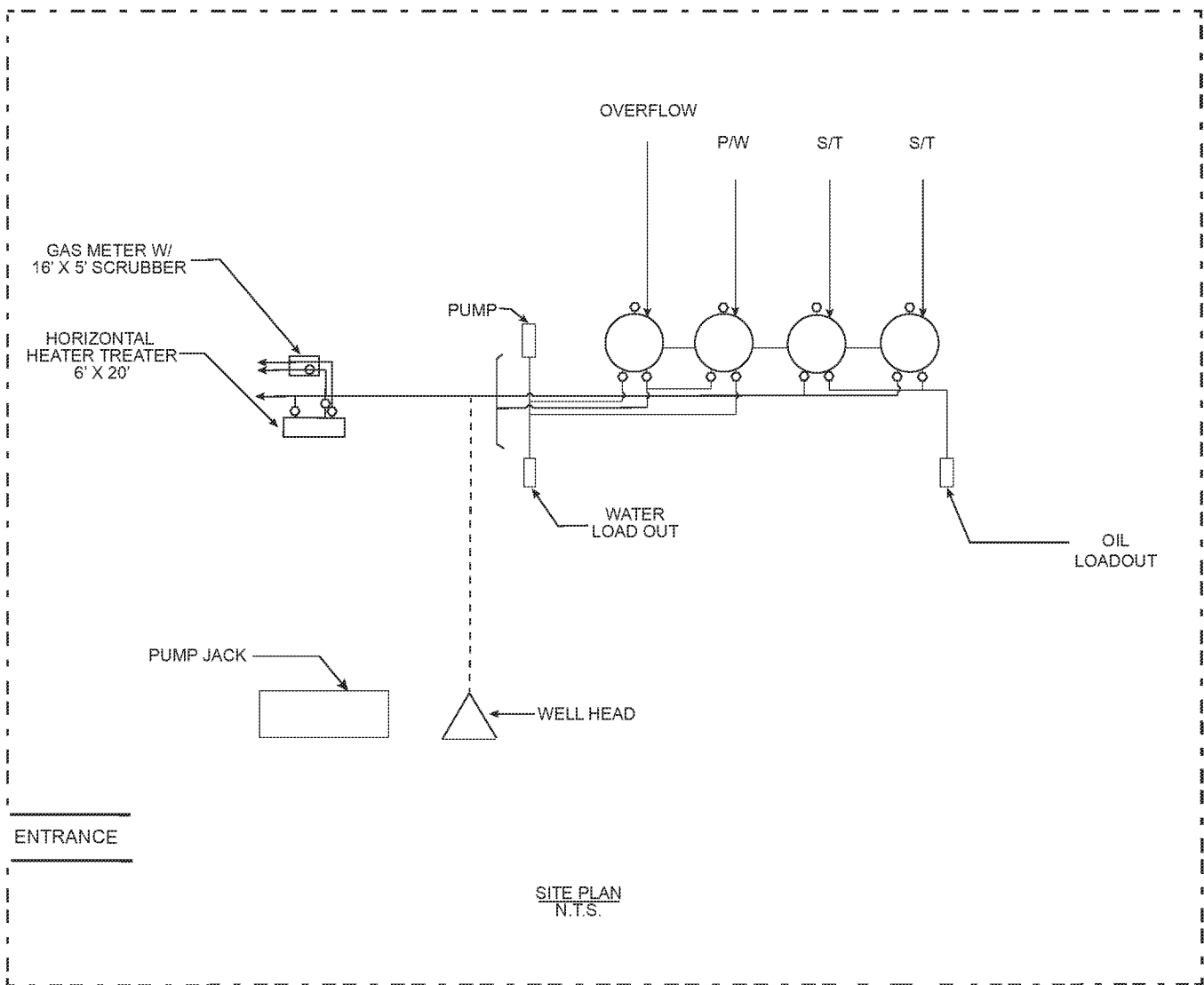
The facility is not a natural gas transmission and storage facility as defined in 40 CFR §63.1270 therefore; this subpart does not apply.

Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

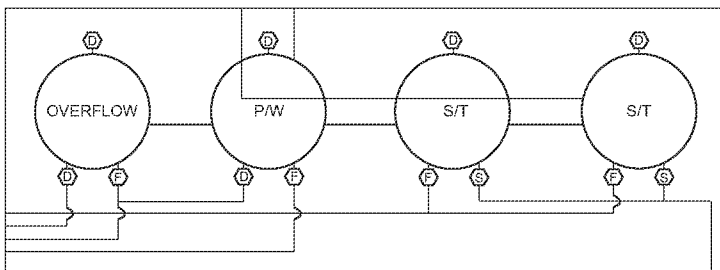
There are no stationary reciprocating internal combustion engines (RICE) located at the site.

APPENDIX A

Process Flow Diagram and Site Plan



VALVE DETAIL A
N.T.S.



VALVE DETAIL B
N.T.S.

LEGEND:

- ABOVE GROUND LINES
- - - - BURIED LINES PROPERTY
- - - - LINE

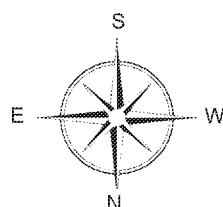
P/W PRODUCED Water

S/T = CRUDE Oil

BBL = BARRELS

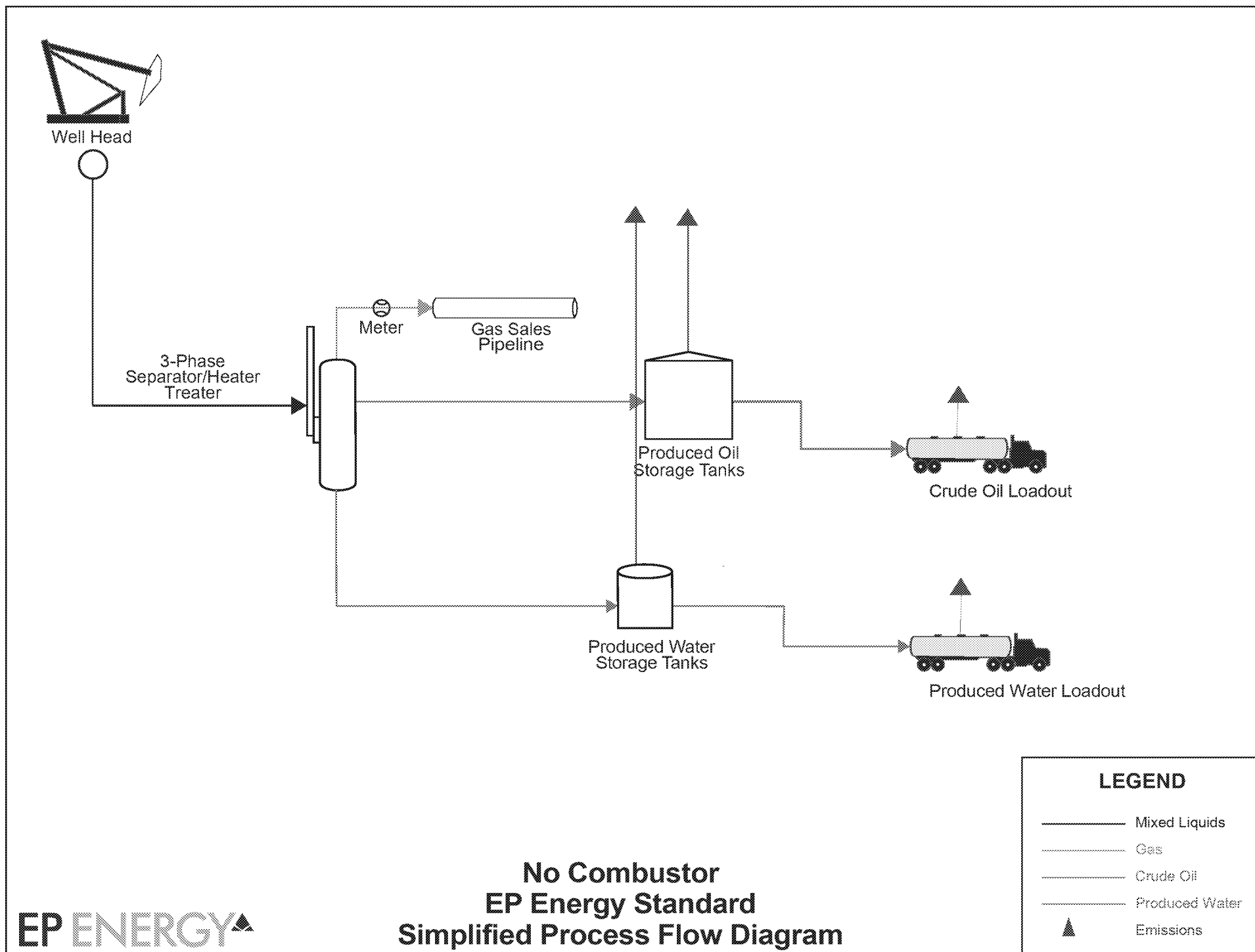
GAL = GALLONS

*OVERFLOW, SCRUBBER
HEATER TREATER CONTAIN
CRUDE OIL AND
PRODUCED WATER



Site Layout
FOWLES 1-26A1
NWSE S26,T1S, R1W
LAT 40.36425° LONG -109.95976
UINTAH COUNTY, UT

Peakview Environmental LLC
EP ENERGY E & P COMPANY, LP June 2019



APPENDIX B

Emissions Calculations

Oil Storage Tanks Flash Emissions - GOR Method
Uncontrolled
EP Energy E&P Company L.P.
Fowles 1-26A1

Site Information

Oil Production ¹	BOPD	6
VRU Operation (NO VRU)		0%
Molecular Weight of Flash Gas	lb/lb-mol	50.95
GOR	scf/bbl	30.03
Flash Heat content	MMBtu/hr	2875

Hourly LP Flash Loss (scf/hr) ³	7.49
Annual LP Flash Loss (MMscf/yr) ⁴	0.07
Flash Emissions Heat Content (MMBtu/hr)	0.02
Flash Emissions Heat Content (MMBtu/yr)	189

Composition Data ²					Uncontrolled Emissions	
Pollutant	LP Flash mol%	MW	Molar Wt	LP Flash Wt%		
			lb/lb-mol gas		(lb/hr) ⁵	(ton/yr) ⁶
Oxygen	0.000	32.00	0.00	0.000	-	-
Carbon Dioxide	0.577	44.01	0.25	0.498	0.01	0.02
Hydrogen Sulfide	0.000	34.80	0.00	0.000	-	-
Nitrogen	2.472	28.01	0.69	1.359	0.01	0.06
Methane	15.558	16.04	2.50	4.898	0.05	0.22
Ethane	10.432	30.07	3.14	6.157	0.06	0.27
Propane	23.739	44.10	10.47	20.547	0.21	0.90
Iso-Butane	4.562	58.12	2.65	5.204	0.05	0.23
Butanes	16.622	58.12	9.66	18.961	0.19	0.84
iso-Pentane	5.218	72.15	3.76	7.389	0.07	0.33
Pentanes	10.688	72.15	7.71	15.135	0.15	0.67
n-Hexane	3.005	86.16	2.59	5.081	0.05	0.22
Other Hexanes	1.699	86.16	1.46	2.873	0.03	0.13
Heptanes +	4.672	100.20	4.68	9.189	0.09	0.40
Benzene	0.664	78.11	0.52	1.018	0.01	0.04
Toluene	0.395	92.13	0.36	0.715	0.01	0.03
Ethylbenzene	0.081	106.17	0.09	0.168	0.00	0.01
Xylenes	0.323	106.17	0.34	0.674	0.01	0.03
2,2,4-Trimethylpentane	0.060	114.23	0.07	0.134	0.00	0.01
Total Volatile Organic Compounds	71.73			87.09	0.88	3.84
Total HAPs					0.08	0.34
Totals	100.77		50.95	100.0		

Uncontrolled

GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO ₂ e ⁸
CO ₂	1	0.5	⁷	0	0
CH ₄	25	4.9	⁷	0	5
Total		-	-	-	5

¹ Daily production = daily production + 1% of daily production (to account for produced water)

² From Precision Analysis Lab Id 16060602-01,6/22/16 Gas Evolved from Flashed Hydrocarbon From 83 psig and 155F to 80F to 14.73 psi and 60F

³ Hourly Flash Loss (scfh) = GOR (scf/bbl) x Throughput (bbl/day) / 24 (hr/day)

⁴ Yearly Flash Loss (MMscf/yr) = Hourly Flash Loss (scfh) x 8760 (hr/yr) / 10⁶

⁵ Uncontrolled Emissions (lb/hr) = Hourly Flash Loss (scf/hr) x Mol% x MW (lb/lb-mol) / 375 (scf/lb-mol)

⁶ Uncontrolled Emissions (ton/yr) = Hourly Flash Loss (scf/hr) x Mol% x MW (lb/lb-mol) / 375 (scf/gas/lb-mol)

*8760 hrs/yr*1 ton/2000 lb

⁷ Stable oil vapor wt%

⁸ Total GHG in CO₂e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Oil Storage Tanks Working and Standing Emissions
Routed to Flare
EP Energy E&P Company L.P.
Fowles 1-26A1

Site Information

Oil Production/tank ¹	bbls/year	1,092	Vapor Density (lb/cu.ft) ⁴	0.01
Oil Production/tank 1	gals/year	45,877	Hourly W&S loss (scf/hr) ⁷	18.2
VRU Operation (NO VRU)		-	Annual W&S loss (MMscf/yr) ⁷	3.8
Molecular Weight of W&S gas ⁴	lb/lb-mol	69.0	Heat Content (MMBtu/hr)	0.0
Reid Vapor Pressure ²		6.14	Heat Content (MMBtu/yr)	0.0
W&S Emissions Heat Content ³	MMBtu/scf	0.0		
Total Site Annual W&S Losses ⁴	lb/yr	2,180.0		
Total Hourly Losses ⁵	lb/hr	0.25		
Total Annual Losses ⁶	ton/yr	1.09		

Composition Data ³		Uncontrolled Emissions	
Pollutant	Stable Oil Vapor Wt%	(lb/hr) ⁸	(ton/yr) ⁹
Oxygen	0.000	-	-
Carbon Dioxide	0.000	-	-
Hydrogen Sulfide	0.000	-	-
Nitrogen	0.104	0.00	0.00
Methane	5.155	0.01	0.06
Ethane	21.520	0.05	0.23
Propane	33.286	0.08	0.36
Iso-Butane	7.911	0.02	0.09
Butanes	19.887	0.05	0.22
iso-Pentane	3.683	0.01	0.04
Pentanes	3.057	0.01	0.03
n-Hexane	1.077	0.00	0.01
Other Hexanes	1.788	0.00	0.02
Heptanes +	1.921	0.00	0.02
Benzene	0.156	0.00	0.00
Toluene	0.124	0.00	0.00
Ethylbenzene	0.077	0.00	0.00
Xylenes ¹¹	0.119	0.00	0.00
2,2,4-Trimethylpentane	0.134	0.00	0.00
Total Volatile Organic Compounds	73.2207	0.18	0.80
Total HAPs		0.00	0.02
Totals	100.000		

Uncontrolled					
GHG	GWP	Emission Factor		Emissions	
		Wt%	Source	tons/yr	CO ₂ e ¹¹
CO ₂	1	0.0	¹⁰	0	0
CH ₄	25	5.2	¹⁰	0	1
Total		-	-	-	1

¹ Annual production = bbls yr /# tanks

² From Precision Analysis Lab Id 16060602-1 6/22/16 Gas Evolved from Flashed Hydrocarbon

³ From Promax stock tank emissions composition

⁴ From TANKS v.4.09d Output Report

⁵ Total Hourly Losses = Total Annual Losses (lb/yr)/8760 hrs/yr

⁶ Total Annual Losses (ton/yr) = Total annual losses (lb/yr)/2000 lb/ton

⁷ Tank emission volumetric flow rates are obtained by dividing total emissions by the vapor density

⁸ lb/hr emissions = Total working and standing losses (lb/hr)* stable oil vapor wt%/100

⁹ ton/yr emissions = Total working and standing losses (ton/yr)* stable oil vapor wt%/100

¹⁰ Stable oil vapor wt%

¹¹ Total GHG in CO₂e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Heater Emissions

EP Energy E&P Company L.P.

Fowles 1-26A1

Site Information

Heater Rating ¹	MMBtu/hr	5.0
Annual Hours of Operation	hr/yr	8,760
Fuel Heating Value ²	Btu/scf	1,200
Fuel Sulfur Content ³	grain/scf	5788.0

Pollutant	Emission Factor		Emissions ⁵	
	EF (lb/10 ⁶ SCF)	AP-42 Source ⁴	lb/hr	tons/yr
NOx	100	Table 1.4-1	0.42	1.83
CO	84	Table 1.4-1	0.35	1.53
SO ₂	0.17	Table 1.4-2	7.1E-04	3.1E-03
PM ₁₀	7.6	Table 1.4-2	0.03	0.14
VOC	5.5	Table 1.4-2	0.02	0.10
Benzene	2.10E-03	Table 1.4-3	8.75E-06	3.83E-05
Hexane	1.8	Table 1.4-3	7.50E-03	3.29E-02
Formaldehyde	7.5E-02	Table 1.4-3	3.13E-04	1.37E-03
Toluene	3.4E-03	Table 1.4-3	1.42E-05	6.21E-05
Total HAPs			7.84E-03	3.43E-02

GHG	GWP	Emission Factor		Emissions	
		EF (lb/10 ⁶ scf)	Source	tons/yr	CO ₂ e ⁶
CO ₂	1	1.20E+05	Table 1.4-2	2,190	2,190
CH ₄	25	2.3	Table 1.4-2	0.0	1
N ₂ O	298	2.2	Table 1.4-2	0.0	12
Total		-	-	-	2,203

¹ Aggregate of all natural-gas fired heaters at the site

² Fuel heat content based on AP-42 pipeline spec

³ AP-42 assumes a fuel sulfur content of 2000 grains/10⁶; emission factor scaled by ratio of actual sulfur content to 2,000 grains/10⁶ scf. Fuel does not contain sulfur so assume MDL.

⁴ Emission factors (EF) are from AP-42 Section 1.4

⁵ Emissions; lb/hr = EF*heater rating (mmBTU/hr)/heat content of fuel(Btu/scf); tons/yr= emissions (lb/hr) * 8760 hrs/yr*1 ton/2000 lbs

⁶ Total GHG in CO₂e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Loading Emissions- Routed to Flare
EP Energy E&P Company L.P.
Fowles 1-26A1

Site Information

Loading Rate	BOPD ⁺	5.99
	gal/day	251.4
	gal/hr	10.47
True VP of Liquid Loaded (P) ¹	psia	5
MW of Vapor (M) ²	lb/lb-mol	41.9
Temperature of liquid (T) ³	°R	619.7
Saturation Factor (S) ⁴	constant	0.6
Loading Losses ⁵ (L)	lb/1000 gal	2.53
Controlled?	Yes/No	No
Control Capture Efficiency	%	0%
Control Efficiency	%`	0%

Composition Data ²		Uncontrolled Emissions ⁶		Uncaptured Emissions ⁸		Controlled Emissions ⁹		Total Emissions ¹⁰	
Pollutant	Stable Oil Vapor Wt%								
		(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Oxygen	0.000	-	-	-	-	-	-	-	-
Carbon Dioxide	0.000	-	-	-	-	-	-	-	-
Hydrogen Sulfide	0.000	-	-	-	-	-	-	-	-
Nitrogen	0.104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methane	5.155	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Ethane	21.520	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.05
Propane	33.286	0.01	0.04	0.01	0.04	0.01	0.04	0.02	0.08
Iso-Butane	7.911	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.02
Butanes	19.887	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.05
iso-Pentane	3.683	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Pentanes	3.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
n-Hexane	1.077	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Hexanes	1.788	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heptanes +	1.921	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene	0.156	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Toluene	0.124	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Ethylbenzene	0.077	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Xylenes	0.119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
2,2,4-Trimethylpentane	0.134	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Total VOCs	73.22	0.02	0.08	0.02	0.08	0.02	0.08	0.04	0.17
Total HAPs		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	100.000								

				Uncontrolled		Controlled	
GHG	GWP	Emission Factor		Emissions			
		Wt%	Source	tons/yr	CO ₂ e ⁷	tons/yr	CO ₂ e ⁷
CO ₂	1	0	NA	0	0	0	0
CH ₄	25	5.2	NA	0.0	0	0.0	0
Total		-	-	-	0	0	0

+ Includes additional 1% oil production to account for produced water

¹From AP-42, Figure 7.1-13

²MW and composition based on Promax output

³Temperature of liquids loaded = 160° F

⁴From AP-42, Table 5.2-1, submerged loading

⁵From AP-42, Section 5.2, equation 1; L=12.46*SPM/T

⁶Emissions lb/hr = L (lb/1000 gal)*Loading rate (gal/hr)/1000 gal*wt%/100

Emissions ton/yr = emissions (lb/hr)*8760/2000

⁷CO₂e based on Global Warming Potentials from Table A-1 of 40 CFR Part 98

⁸Uncaptured emissions = uncontrolled emissions * (1-capture efficiency)

⁹Controlled Emissions = uncontrolled loading * capture efficiency*(1-control efficiency)

¹⁰Total emissions = uncaptured emissions + controlled emissions

Fugitive Emissions
EP Energy E&P Company L.P.
Fowles 1-26A1

Equations¹

$$E_{gas} = \sum i \sum j Q_{fug,i,j} \times n_i \times t_{annual}$$

$$E_c = f_c \times E_{gas}$$

Site Information

Q_{fug,i,j}=Measured/estimated fugitive emissions rate of gas from component (i) in service (j) (lb gas/ component-hr)

Service Type =

Flash Gas²

Conversion factor (scf/lb-mol) =

379.48

f_{nH} = mass fraction of n-hexane =

5.08

MW=molecular weight (lb/lb-mol) =

50.95

f_{Bz} = mass fraction of benzene =

1.02

f_{voc}=VOC mass fraction =

87.09

f_{TI} = mass fraction of toluene =

0.72

f_{co2}= mass fraction CO2

0.5

f_{Eb} = mass fraction of ethylbenzene =

0.17

f_{CH4}= ass fraction CH4

4.9

f_{XV} = mass fraction of xylene =

0.67

t_{annual} = annual usage for component

8760

f_{ttmp} = mass fraction of 2,2,4-TMP =

0.13

Component Count - Light Oil Service³

Equipment	Number	Valves	Flanges	Connectors	OE Lines	Pump Seals	Other
Wells	1	5	10	4	0	0	1
Separator	0	0	0	0	0	0	0
Heater Treater	1	8	12	20	0	0	0
Header	1	5	10	4	0	0	0
Total Components		18	32	28	0	0	1

Light Oil (>20o) Fugitive Emissions

	Valves	Flanges	Connectors	OE Lines	Pump Seals	Other	Total Emissions	
							tons/yr	lbs/yr
Total Emissions (ton/yr)								
EF= scf/component-hr ¹	0.05	0.003	0.007	0.05	0.01	0.30		
lb/component-hr	6.71E-03	4.03E-04	9.40E-04	6.71E-03	1.34E-03	4.03E-02		
Total Emissions (ton/yr) ⁶	5.29E-01	5.65E-02	1.15E-01	0.00E+00	0.00E+00	1.76E-01	0.88	
GHG Emissions								
CO ₂ (ton/yr)	2.65E-03	2.82E-04	5.76E-04	0.00E+00	0.00E+00	8.82E-04	4.39E-03	8.77
CH ₄ (ton/yr)	2.59E-02	2.77E-03	5.65E-03	0.00E+00	0.00E+00	8.64E-03	4.30E-02	85.99
GHG CO ₂ e							9.98E-02	219.37
VOC Emissions								
VOC (ton/yr)	4.61E-01	4.92E-02	1.00E-01	0.00E+00	0.00E+00	1.54E-01	0.76	1528.26
HAP Emissions								
n-hexane (ton/yr)	2.69E-02	2.87E-03	5.86E-03	0.00E+00	0.00E+00	8.96E-03	4.46E-02	89.14
benzene (ton/yr)	5.40E-03	5.76E-04	1.18E-03	0.00E+00	0.00E+00	1.80E-03	8.95E-03	17.90
toluene (ton/yr)	3.81E-03	4.06E-04	8.30E-04	0.00E+00	0.00E+00	1.27E-03	6.32E-03	12.63
ethylbenzene (ton/yr)	8.89E-04	9.48E-05	1.94E-04	0.00E+00	0.00E+00	2.96E-04	1.47E-03	2.95
xylene (ton/yr)	3.55E-03	3.78E-04	7.72E-04	0.00E+00	0.00E+00	1.18E-03	5.88E-03	11.76
2,24-TMP (ton/yr)	7.09E-04	7.56E-05	1.54E-04	0.00E+00	0.00E+00	2.36E-04	1.18E-03	2.35
Total HAPs							0.07	136.73

¹ Equations and emission factors based on 40 CFR Part 98 Subpart W

² Composition based on hydrocarbon analysis of site-specific oil and gas samples

³ Component counts based on default values from 40 CFR Part 98 Subpart W; Table W-1C

⁴ CO₂e based on Global Warming Potentials from Table A-1 of 40 CFR Part 98

⁵ Total GHG in CO₂e (tpy) calculated using Global Warming Potential from 40 CFR 98 Subpart A, Table A-1

Criteria Pollutants Emissions Summary
EP Energy E&P Company L.P.
Fowles 1-26A1

Uncontrolled Requested PTE

Pollutant (TPY)	VOC	CO	NO_x	SO₂	PM₁₀	PM_{2.5}
Oil/PW Storage Tanks	4.63	-	-	-	-	-
Truck Loading	0.08	-	-	-	-	-
Methanol Storage Tank						
Heaters (≤5.0 MMBtu/hr total)	0.10	1.53	1.83	0.00	0.14	0.14
Fugitives	0.76	-	-	-	-	-
Total	5.58	1.53	1.83	0.00	0.14	0.14

CO₂e Emissions Summary
EP Energy E&P Company L.P.
Fowles 1-26A1

CO₂e Uncontrolled Requested PTE

GHG (TPY)	CO₂	CH₄	N₂O	Total
<i>Global Warming Potential</i>	<i>1</i>	<i>25</i>	<i>298</i>	<i>-</i>
Oil/PW Storage Tanks	0.0	0.3	0.00	0.3
Truck Loading	0.0	0.0	0.00	0.0
Methanol Storage Tank	0.0	0.0	0.00	0.0
Heaters (≤5.0 MMBtu/hr total)	2,190.0	0.0	0.04	2190.1
Fugitives	0.0	0.04	0.00	0.0
Total Mass (TPY)	2,190	0	0.0	2,190
CO₂e (tpy)	2,190	9	12	2,211

HAPs Emissions Summary
EP Energy E&P Company L.P.
Fowles 1-26A1

Uncontrolled Requested PTE (tpy)

Pollutant (TPY)	n-Hexane	Benzene	Toluene	e-benzene	Xylenes	2,2,4-TMP	Formaldehyde	Acetaldehyde	Acrolein	Methanol	Total HAPs
Oil/PW Storage Tanks	0.24	0.05	0.03	0.01	0.03	0.01	-	-	-	-	0.36
Truck Loading	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00
Heaters (≤5.0 MMBtu/hr total)	0.03	0.00	0.00	-	-	-	-	-	-	-	0.03
Fugitives	0.04	0.01	0.01	0.00	0.01	0.00	-	-	-	-	0.07
Total	0.31	0.06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.46

HAPs Hourly Maximum Emission Rate

Pollutant (lb/hr)	n-hexane	Benzene	Toluene	e-benzene	Xylenes	2,2,4-TMP	Formaldehyde	Acetaldehyde	Acrolein	Methanol	Total HAPs
Oil/PW Storage Tanks											
Truck Loading	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00
Heaters (≤5.0 MMBtu/hr total)	0.01	0.00	0.00	-	-	-	-	-	-	-	0.01
Fugitives	0.01	0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.01
Total	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Laboratory Analytical Report and Promax Output



GAS MEASUREMENT

EMISSIONS TESTING

LABORATORY

866.985.0865

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Flash Liberation of Hydrocarbon Liquid Study

Client: LT Environmental **Sample Lab ID:** 16060602-01
Site Name: Powell 2-13 A2 **Analyst:** AP
Unique Number: Not Indicated **Date Analyzed:** 06/22/16
Date Sampled: 06/17/16
State: UT **Site Notes:**
County: Duchesne

Flash Liberation of Hydrocarbon Liquid Conditions

	Pressure (psig)	Temperature (°F)
Separator Hydrocarbon Liquid	83.0	155.0
Stock Tank	80.0	160.0

Base Conditions

	Pressure (psi)	Temperature (°F)
Base Conditions	14.73	60

Flash Liberation of Hydrocarbon Liquid Results

Parameter	Result	Units/Description
Gas Oil Ratio	30.03	SCF flashed vapor/bbl stock tank oil
Gas Specific Gravity	1.770	Air = 1.000
Separator Volume Factor	1.001	Separator Volume/Stock tank Volume

Stock Tank Fluid Properties

Parameter	Result	Units/Description
Shrinkage Recovery Factor	0.999	Fraction of first stage separator liquid
Oil API Gravity at 60 °F	31.94	
Oil API Gravity, observed	33.44	at 83°F
Reid Vapor Pressure, psi	6.14	Absolute Pressure at 100°F by D5191

Quality Control Summary

Duplicate Results	% Difference	Acceptable Range
Gas Oil Ratio	3.3	<5%
Separator Volume Factor	0.003	<5%
Shrinkage Recovery Factor	0.003	<5%
Cylinder Type	Liquid Displacement	
Sample Collection Rate (mL/min)	50	<60

Cylinder Pressure Check

	Pressure (psi)	Temperature (°F)
Sample Conditions	83.0	155.0
Test Sample	30.0	150.0



GAS MEASUREMENT

EMISSIONS TESTING

LABORATORY

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Gas Evolved from Flashed Hydrocarbon Liquid

Run File: C:\Galaxie\data\16_06_22\16060602-011.DAT
Method: S2_ExtBTEX
Operator: AP **Analysis Date:** 6/22/2016
Client: LT Environmental **Date Sampled:** 6/22/2016
Site Name: Powell 2-13 A2 **Purpose:** Flash Gas Analysis
Unique #: Not Indicated **Pressure:** Ambient
Sample Temperature: 70°F **Type Sample:** Spot
Sampled by: AP **County:** Duchesne

COMPONENT	MOLE %	GPM
Hydrogen Sulfide	0.000	0.000
Nitrogen (N2)	2.472	
Carbon Dioxide	0.577	
Methane (CH4)	15.557	
Ethane (C2)	10.432	2.783
Propane (C3)	23.740	6.524
iso-Butane (i-C4)	4.562	1.489
Butane (C4)	16.620	5.226
iso-Pentane (i-C5)	5.218	1.903
Pentane (C5)	7.472	2.702
Hexanes	7.054	0.676
Heptanes Plus	6.297	4.768
Totals	100.000	26.070

Specific Gravity 1.770
Compressibility (Z) 0.9732
Molecular Weight 50.95

Saturated Ideal BTUs 2749.1 Saturated Real BTUs 2824.8

Dry Ideal BTUs 2797.8 Dry Real BTUs 2874.9

Base Conditions: 14.73 psi 60 °F

Gas Evolved from Flashed Hydrocarbon Liquid Extended Analysis Report

COMPONENT	MOLE %	BTU	GPM	WT %
Hydrogen Sulfide	0.000	0.000	0.000	0.000
Nitrogen (N2)	2.472			1.359
Carbon Dioxide	0.577			0.498
Methane (CH4)	15.557	157.486		4.898
Ethane (C2)	10.432	185.042	2.783	6.157
Propane (C3)	23.740	598.701	6.524	20.547
iso-Butane (i-C4)	4.562	148.691	1.489	5.204
Butane (C4)	16.620	543.458	5.226	18.961
iso-Pentane (i-C5)	5.218	209.255	1.903	7.389
Pentane (C5)	7.472	300.227	2.702	10.581
2,2-Dimethylbutane	0.229	8.057	0.068	0.315
Cyclopentane	1.717	60.427	0.507	2.363
2,3-Dimethylbutane	0.343	12.085	0.101	0.473
2-Methylpentane	0.522	23.011	0.213	0.883
3-Methylpentane	0.308	13.549	0.125	0.520
n-Hexane	3.004	143.192	1.232	5.081
Methylcyclopentane	0.679	37.424	0.312	1.335
Benzene	0.664	23.887	0.185	1.018
Cyclohexane	0.579	24.271	0.197	0.957
2-Methylhexane	0.145	6.068	0.049	0.239
3-Methylhexane	0.207	8.668	0.070	0.342
2,2,4-Trimethylpentane	0.060	3.459	0.031	0.134
Other Heptanes (C7's)	1.131	62.373	0.520	2.224
n-Heptane	0.452	24.949	0.208	0.890
Methylcyclohexane	0.537	26.199	0.215	1.036
Toluene	0.395	16.936	0.132	0.715
Other Octanes (C8's)	0.386	24.184	0.197	0.866
n-Octane	0.208	13.022	0.106	0.466
Ethylbenzene	0.080	4.006	0.031	0.168
m,p-Xylene	0.270	13.429	0.105	0.563
o-Xylene	0.053	2.638	0.021	0.111
Other Nonanes (C9's)	0.350	24.575	0.197	0.882
n-Nonane	0.189	13.233	0.106	0.475
Other Decanes (C10's)	0.589	45.723	0.361	1.645
n-Decane	0.168	13.064	0.103	0.470
Undecanes (C11)	0.084	6.532	0.052	0.235
Totals	100.000	2797.8	26.070	100.000

Specific Gravity 1.770
Compressibility (Z) 0.973
Molecular Weight 50.948

Saturated Ideal BTUs 2749.1 Saturated Real BTUs 2824.8

Dry Ideal BTUs 2797.8 Dry Real BTUs 2874.9

Base Conditions: 14.73 psi 60 °F



GAS MEASUREMENT EMISSIONS TESTING LABORATORY
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**EXTENDED HYDROCARBON LIQUID STUDY
CERTIFICATE OF ANALYSIS**

Company: **LT Environmental** Sample Name: **Powell 2-13 A2 Pressurized Liquid**

Sample Date: 6/17/2016 Sample Number: 16060602-01

Sample Facility: Not Indicated Date Tested: 6/22/2016

Sample Equipment: Treater Vessle Test Method: GPA 2186M

Sample Location: Duchesne Date Reported: 6/22/2016

Sample Pressure: 81 PSIG

Sample Temperature: 155°F

Sampling Method: GPA-2174

Type Sample: Spot

Components	Mole %	Weight %	Liq. Vol. %
Carbon Dioxide	0.000	0.000	0.000
Nitrogen	0.047	0.006	0.006
Methane	1.387	0.108	0.275
Ethane	0.901	0.132	0.282
Propane	1.657	0.355	0.534
iso-Butane	0.598	0.169	0.229
n-Butane	1.980	0.592	0.768
iso-Pentane	0.659	0.231	0.282
n-Pentane	0.698	0.245	0.296
2-Methylpentane	0.543	0.227	0.265
3-Methylpentane	0.217	0.091	0.106
Heptanes	1.432	0.698	0.785
Octanes	2.321	1.289	1.407
Nonanes	1.527	0.937	0.912
Decanes+	83.864	93.890	92.868
Benzene	0.144	0.055	0.047
Toluene	0.286	0.128	0.112
Ethylbenzene	0.392	0.203	0.177
m-Xylene	0.388	0.201	0.176
p-Xylene	0.063	0.032	0.028
o-Xylene	0.146	0.076	0.065
n-Hexane	0.595	0.249	0.286
2,2,4-Trimethylpentane	0.155	0.086	0.094
Totals	100.000	100.000	100.000

SAMPLE CHARACTERISTICS

RELATIVE SPECIFIC GRAVITY, calculated	0.76239
API GRAVITY AT 60/60 F, calculated	54.1
TRUE VAPOR PRESSURE AT 100 F, PSIA, calculated	83.856
AVERAGE MOLECULAR WEIGHT	205.670
AVERAGE BOILING POINT, F, calculated	477.926
RELATIVE SPECIFIC GRAVITY OF DECANES+ (C10+) FRACTION, calculated	0.76697
AVERAGE MOLECULAR WEIGHT OF DECANES+ (C10+) FRACTION, calculated	215.149
BTU / GALLON OF LIQUID AT 14.73 PSIA, calculated	59,364.49
LBS / GALLON OF LIQUID, calculated	6.356

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-09, THE TABLES
OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST
TO THE NATURAL GAS INDUSTRY.

Powell 2-13A2K
ProMax Emissions Output

Process Streams	Residual Oil	Working Breathing
Composition	From Block:	To Block:
Phase: Total	VSGL-100	
Mole Fraction	%	%
Nitrogen	0.047*	0.153049*
Methane	1.387*	13.2531*
Ethane	0.901*	29.5124*
Propane	1.657*	31.1336*
i-Butane	0.598*	5.61379*
n-Butane	1.98*	14.1122*
i-Pentane	0.659*	2.10557*
n-Pentane	0.698*	1.74756*
2-Methylpentane	0.543*	0.628189*
3-Methylpentane	0.217*	0.227722*
Heptane	1.432*	0.428482*
Octane	2.321*	0.243435*
Nonane	1.527*	0.0567254*
Benzene	0.144*	0.0824711*
Toluene	0.286*	0.0554282*
Ethylbenzene	0.392*	0.0298483*
m-Xylene	0.388*	0.0344221*
p-Xylene	0.063*	0.00427509*
o-Xylene	0.146*	0.00767785*
n-Hexane	0.595*	0.515504*
2,2,4-Trimethylpentane	0.155*	0.0485079*
decane+	83.864*	0.00601618*
Mass Fraction	%	%
Nitrogen	0.00682324*	0.103954*
Methane	0.115312*	5.15505*
Ethane	0.140401*	21.5163*
Propane	0.378656*	33.2865*
i-Butane	0.180123*	7.91119*
n-Butane	0.596395*	19.8876*
i-Pentane	0.246400*	3.68334*
n-Pentane	0.260982*	3.05706*
2-Methylpentane	0.242499*	1.31255*
3-Methylpentane	0.0969103*	0.475809*
Heptane	0.743612*	1.04100*
Octane	1.37397*	0.674221*
Nonane	1.01494*	0.176399*
Benzene	0.0582916*	0.156193*
Toluene	0.136563*	0.123827*
Ethylbenzene	0.215672*	0.0768323*
m-Xylene	0.213472*	0.0886058*
p-Xylene	0.0346616*	0.0110045*
o-Xylene	0.0803269*	0.0197635*
n-Hexane	0.265722*	1.07711*
2,2,4-Trimethylpentane	0.0917557*	0.134348*
decane+	93.5065*	0.0313837*

CO2 0

Methane 5.155* 0.05155046

wt% wt fraction

VOC 73.225* 0.73224669

B 0.156* 0.00156193

T 0.124* 0.00123827

E 0.077* 0.00076832

X 0.119* 0.00119374

n-hex 1.077* 0.01077106

2,2,4 0.134* 0.00134348

Powell 2-13A2K
ProMax Emissions Output

Mass Flow	lb/h	lb/h
Nitrogen	0.915517*	0.00417860*
Methane	15.4721*	0.207216*
Ethane	18.8385*	0.864887*
Propane	50.8067*	1.33801*
i-Butane	24.1683*	0.318004*
n-Butane	80.0221*	0.799416*
i-Pentane	33.0611*	0.148058*
n-Pentane	35.0177*	0.122884*
2-Methylpentane	32.5376*	0.0527604*
3-Methylpentane	13.0031*	0.0191260*
Heptane	99.7751*	0.0418450*
Octane	184.354*	0.0271015*
Nonane	136.181*	0.00709066*
Benzene	7.82136*	0.00627846*
Toluene	18.3236*	0.00497744*
Ethylbenzene	28.9381*	0.00308841*
m-Xylene	28.6428*	0.00356167*
p-Xylene	4.65077*	0.000442346*
o-Xylene	10.7780*	0.000794431*
n-Hexane	35.6536*	0.0432962*
2,2,4-Trimethylpentane	12.3114*	0.00540035*
decane+	12546.4*	0.00126152*

CO2	0	
Methane	0.207*	0.908*
		UNC
	lb/hr	tpy
VOC	2.943*	12.892*
B	0.006*	0.027*
T	0.005*	0.022*
E	0.003*	0.014*
X	0.005*	0.021*
n-hex	0.043*	0.190*
2,2,4	0.005*	0.024*

Process Streams		Residual Oil	Working Breathing
Properties	Status:	Residual Oil	Working Breathing
Phase: Total	From Block:
	To Block:	VSSL-188	..
Property	Units		
Temperature	°F	155*	124.242*
Pressure	psia	14.6959*	14.3998
Mole Fraction Vapor	%	3.37971	100*
Mole Fraction Light Liquid	%	96.6203	0
Mole Fraction Heavy Liquid	%	0	0
Molecular Weight	lb/lbmol	192.963	41.2436
Mass Density	lb/ft^3	9.99300	0.0958419
Molar Flow	lbmol/h	69.5349	0.0974619
Mass Flow	lb/h	13417.6	4.01968*
Vapor Volumetric Flow	ft^3/h	1342.70	41.9407
Liquid Volumetric Flow	gpm	167.402	5.22897
Std Vapor Volumetric Flow	MMSCFD	0.633297	0.000887645
Std Liquid Volumetric Flow	sgpm	35.3839	0.0168744
Compressibility		0.0430199	0.988887
Specific Gravity			1.42403
API Gravity			
Enthalpy	Btu/h	-1.02556E+07	-4205.73
Mass Enthalpy	Btu/lb	-764.334	-1046.29
Mass Cp	Btu/(lb*°F)	0.547772	0.438862
Ideal Gas CpCv Ratio		1.02345	1.12397
Dynamic Viscosity	cP		0.00928859
Kinematic Viscosity	cSt		6.05025
Thermal Conductivity	Btu/(h*ft*°F)		0.0130719
Surface Tension	lbf/ft		
Net Ideal Gas Heating Value	Btu/ft^3	9641.79	2167.61
Net Liquid Heating Value	Btu/lb	18810.5	19794.6
Gross Ideal Gas Heating Value	Btu/ft^3	10315.7	2357.90
Gross Liquid Heating Value	Btu/lb	20135.9	21545.4

bbl/day 1213.163717

TANKs 4.09d Emissions Report

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Altamont 500 bbl heated oil tank
City:	Salt Lake City
State:	Utah
Company:	EP Energy E&P Company LP
Type of Tank:	Vertical Fixed Roof Tank
Description:	150,000 BOPY

Tank Dimensions

Shell Height (ft):	21.00
Diameter (ft):	13.00
Liquid Height (ft) :	19.00
Avg. Liquid Height (ft):	16.00
Volume (gallons):	18,865.29
Turnovers:	166.97
Net Throughput(gal/yr):	3,150,000.00
Is Tank Heated (y/n):	Y

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition:	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	2.00
Radius (ft) (Dome Roof)	13.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Gasoline (RVP 6)	All	0.00	0.00	0.00	0.00	0.7163	0.7163	0.7163	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

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Annual Emission Calculations

Standing Losses (lb):	0.0000
Vapor Space Volume (cu ft):	800.5825
Vapor Density (lb/cu ft):	0.0100
Vapor Space Expansion Factor:	0.0000
Vented Vapor Saturation Factor:	0.8137
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	800.5825
Tank Diameter (ft):	13.0000
Vapor Space Outage (ft):	6.0316
Tank Shell Height (ft):	21.0000
Average Liquid Height (ft):	16.0000
Roof Outage (ft):	1.0316
Roof Outage (Dome Roof)	
Roof Outage (ft):	1.0316
Dome Radius (ft):	13.0000
Shell Radius (ft):	6.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0100
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Daily Avg. Liquid Surface Temp. (deg. R):	459.6700
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	459.6700
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,452.1184
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range (psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.7163
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.7163
Daily Avg. Liquid Surface Temp. (deg. R):	459.6700
Daily Min. Liquid Surface Temp. (deg. R):	459.6700
Daily Max. Liquid Surface Temp. (deg. R):	459.6700
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8137
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Vapor Space Outage (ft):	6.0316
Working Losses (lb):	1,283.8399
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7163
Annual Net Throughput (gall/yr.):	3,150,000.0000
Annual Turnovers:	166.9734
Turnover Factor:	0.3463
Maximum Liquid Volume (gal):	18,865.2856
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	13.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,283.8399

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Altamont 500 bbl heated oil tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	1,283.84	0.00	1,283.84

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	500 gal Methanol Tank
City:	Salt Lake City
State:	Utah
Company:	EP Energy
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	6.00
Diameter (ft):	4.00
Liquid Height (ft) :	6.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	564.02
Turnovers:	3.19
Net Throughput(gal/yr):	1,800.00
Is Tank Heated (y/n):	Y

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition:	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	22.00
Radius (ft) (Dome Roof)	4.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meteorological Data used in Emissions Calculations: Salt Lake City, Utah (Avg Atmospheric Pressure = 12.64 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Methyl alcohol	All	59.41	49.72	69.11	54.20	1.4158	1.0351	1.9099	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

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Annual Emission Calculations

Standing Losses (lb):	55.7471
Vapor Space Volume (cu ft):	5,738.6426
Vapor Density (lb/cu ft):	0.0081
Vapor Space Expansion Factor:	0.1153
Vented Vapor Saturation Factor:	0.0284
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	5,738.6426
Tank Diameter (ft):	4.0000
Vapor Space Outage (ft):	456.6667
Tank Shell Height (ft):	6.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	454.6667
Roof Outage (Dome Roof)	
Roof Outage (ft):	454.6667
Dome Radius (ft):	4.0000
Shell Radius (ft):	2.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0081
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Daily Avg. Liquid Surface Temp. (deg. R):	519.0816
Daily Average Ambient Temp. (deg. F):	51.9625
Ideal Gas Constant R	
(psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.8725
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sq ft day):	1,452.1184
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1153
Daily Vapor Temperature Range (deg. R):	19.3870
Daily Vapor Pressure Range (psia):	0.8748
Breather Vent Press. Setting Range (psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	1.0351
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.9099
Daily Avg. Liquid Surface Temp. (deg. R):	519.0816
Daily Min. Liquid Surface Temp. (deg. R):	509.3881
Daily Max. Liquid Surface Temp. (deg. R):	528.7751
Daily Ambient Temp. Range (deg. R):	23.3583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.0284
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Vapor Space Outage (ft):	456.6667
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.4156
Annual Net Throughput (gall/yr.):	1,800.0000
Annual Turnovers:	
Turnover Factor:	3.1914
Maximum Liquid Volume (gal):	1.0000
Maximum Liquid Height (ft):	584.0197
Tank Diameter (ft):	6.0000
Working Loss Product Factor:	4.0000
	1.0000
Total Losses (lb):	57.6909

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

500 gal Methanol Tank - Vertical Fixed Roof Tank
Salt Lake City, Utah

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	1.94	55.75	57.69